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**0 430 509 A3**

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## EUROPEAN PATENT APPLICATION

21 Application number: 90312494.9

51 Int. Cl.5: H03F 3/62, H03F 3/60

22 Date of filing: 16.11.90

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DE FR GB IT

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54 Symmetric bi-directional amplifier.

97 A transceiver module (10) includes a bi-directional amplifier (16) having a pair of symmetric signal paths for amplification of both transmit and receive signals. The bi-directional amplifier (16) is disposed between a pair of r.f. switches (14, 18) to provide a pair of signal paths between two terminals of the module (10). The amplifier (16) has an input propagation network (30) coupling two input terminals (16a, 16b), and an output propagation network (32) coupling two output terminals (16c, 16d). A plurality of FETs (FET1, FET2, FET3, FET4) have their gates connected to the input propagation network (30) and their drains connected to the output propagation network (32). Electrical path lengths are selected so that an input signal at one input terminal (16a) propagates with amplification to one output terminals (16c) and an input signal at the other input terminal (16b) propagates with amplification to the other output terminal (16d).

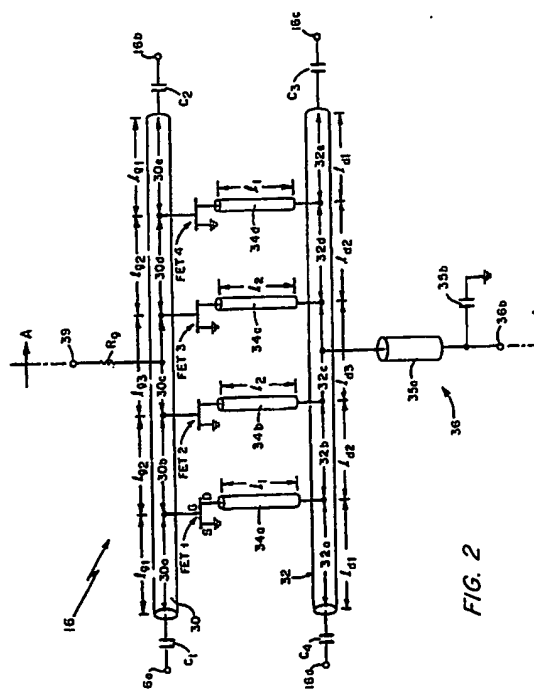


FIG. 2



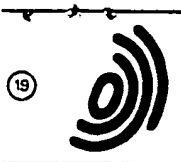
DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	EP-A-0 285 345 (NATIONAL RESEARCH DEVELOPMENT CORP.) * Page 1, line 55 - page 2, line 4; page 4, lines 11-18; page 4, lines 35-46; figure 2 * - - -	1-5	H 03 F 3/62 H 03 F 3/60
Y	EP-A-0 216 432 (PHILIPS ELECTRONIC) * Column 4, line 17 - column 5, line 22; figure 1 * - - -	1-5	
Y	US-A-4 752 746 (K.B. NICLAS) * Figure 2; column 2, lines 15-30; column 4, lines 35-40 * - - -	1-5	
A		9	
A	ELECTRONICS LETTERS, vol. 24, no. 5, 3rd March 1988, pages 264-265, Stevenage, Herts, GB; O.P. LEISTEN et al.: "Distributed amplifiers as duplexer/low crosstalk bidirectional elements in S-band" * Figures 1,2; page 264, column 2, line 18 - page 265, column 1, line 2; page 265, column 1, lines 33-35 * - - -	1-4	
P,A	IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM DIGEST, Dallas, Texas, 8th - 10th May 1990, vol. 2, pages 907-910; T. TSUKII et al.: "Wideband bidirectional MMIC amplifiers for new generation T/R module" * Figures 1A,1B,2A; page 907, column 1, line 17 - column 2, line 4; page 908, column 1, lines 1-38 * - - - - -	1-4	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)  H 03 F
Place of search  The Hague		Date of completion of search  20 August 91	Examiner  WALDORFF U.
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention		E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &: member of the same patent family, corresponding document	

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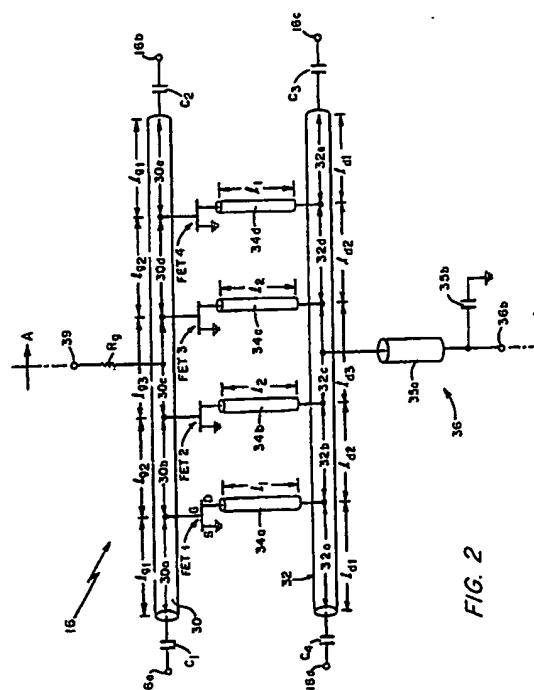
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# EUROPEAN SEARCH REPORT

EP 90 31 2494

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<div>CATEGORY OF CITED DOCUMENTS</div> <div><div>X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention</div><div>E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &amp;: member of the same patent family, corresponding document</div></div>			